AMENDMENTS TO THE DRAWINGS

The attached "Replacement Sheet" of drawings includes changes to Figure 6. The attached "Replacement Sheet," which includes Figures 6 and 7, replaces the original sheet including Figures 6 and 7.

Attachment: Replacement Sheet

REMARKS

Claims 1-11 are now pending in the application. Claims 1, 3-5, and 7-8 are currently amended. No new matter has been added as all amendments are supported by the specification, claims, and drawings as originally filed. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

DRAWINGS

The drawings stand objected to for certain informalities. Applicant has attached revised drawings for the Examiner's approval. In the "Replacement Sheet" Applicant has amended Figure 6 according to the Examiner's suggestion by adding the legend --Prior Art--.

OBJECTION TO THE CLAIMS

Claim 7 stands objected to for certain informalities. Applicant has adopted the changes recommended by the Examiner. Therefore, reconsideration and withdrawal of this objection are respectfully requested.

REJECTION UNDER 35 U.S.C. § 112

Claim 3 stands rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point and distinctly claim the subject matter which

Applicant regards as the invention. Applicant has amended claim 3 to overcome the rejection. In view of the foregoing, Applicant requests withdrawal of the rejection.

REJECTION UNDER 35 U.S.C. § 102

Claims 1 and 5-7 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Chapman (U.S. Pat. No. 5,974,027). Claims 8 and 10 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Mochizuki et al. (U.S. Pat. No. 6,122,249). These rejections are respectfully traversed.

Reconsideration of the rejection of claims 1 and 5-7 under 35 U.S.C. 102(b) as being anticipated by Chapman is respectfully requested on the grounds that Chapman does not anticipate, teach, or suggest the following features in the claims 1 and 5-7 "dividing the optical port into multiple minimum protection units; dividing the minimum protection units of more than one protection channel in each optical port into different logic-systems to form more than one logic-system; each logic node in each logic-system working in one of the four working modes: normal working mode, passing working mode, bridging working mode and switching working mode; and when the protection is needed, switching normal working mode of each node to the other three working modes".

Reconsideration of the rejection of claims 8 and 10 under 35 U.S.C. 102(b) as being anticipated by Mochzuki is also respectfully requested on the grounds that Mochzuki does not anticipate, teach, or suggest the following features in the amended claims 8 and 10 "a component configured to divide the optical port into multiple

minimum protection units; and divide the minimum protection units of more than one protection channel in each optical port into different logic-systems to form more than one logic-system".

Before discussing the rejections in detail, Applicant would like to address a few technical terms used in claim 1 of the present application.

1. Minimum Protection Unit

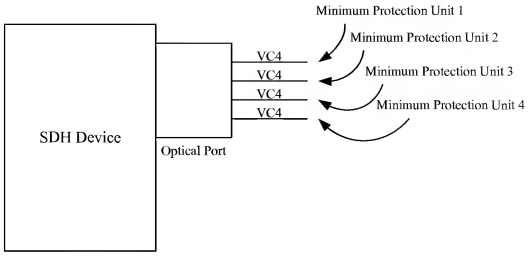
As one skilled in the art would recognize, also addressed in the background part of Chapman, there is more than one kind of protection method applied in a SDH fiber transmission network, one of which is multiplex section (MS) protection, and another is path protection. On one hand, since MS protection is a protection method based on the physical optical port, i.e. the protection granularity of MS protection is a physical optical port of a device (or a node) in the SDH network, it does not flexibly implement appropriate protection based on different services and thus causes a waste on virtual containers (VCs). On the other hand, the path protection is a protection method based on the carried services, i.e. the protection granularity of path protection is the service channels carried, so it is much more flexible, but because the number of services carried in a SDH network would be very large and switching should be made for each service channel separately, the protection based on service channel, would be very complicated.

It is required to provide a protection method with a proper protection granularity, and suitable complexity. The subject application is directed to a new abstract concept of a minimum protection unit which actually refers to a relatively proper protection

granularity. The minimum protection unit is obtained by dividing a physical optical port into several parts, each part of the physical optical port is a minimum protection unit, and it can be as big as a physical port, and also can be as small as the service channels carried. A minimum protection unit may be a VC4. From a logical point of view, the minimum protection unit divides a fiber into several logical fibers and also divides a node into several logical nodes. Therefore, the protection method based on the minimum protection unit is more flexible than MS protection and is less complex than path protection.

For example, consider an optical port with 622Mbit/s to compare the above three kinds of protection methods. Suppose this optical port contains 20 service channels. If MS protection is adopted when a fault appears, the optical port will be switched as a whole, no matter whether a service channel contained in this optical port is influenced or not by the fault. If path protection is adopted, each service channel influenced by the fault will be switched separately. That is, if a service channel is influenced by the fault, it will switch to a protection channel, and if a service channel is not influenced by the fault, it will not switch. Since in most cases the number of the service channels influenced by the fault would be very large, the process of switching all the service channels separately would be very complicated.

Since this 622Mbit/s optical port can be regarded as four independent VC4, each VC4 can be taken as a minimum protection unit as illustrated in the following diagram.



In this case, if a protection method based on the minimum protection unit is adopted, when a fault appears, each minimum protection unit influenced by the fault will be switched separately. Since the protection granularity is the minimum protection unit rather than the whole optical port, this method is more flexible than MS protection, and since the protection granularity is the minimum protection unit rather than the service channels, this method is less complex than channel protection.

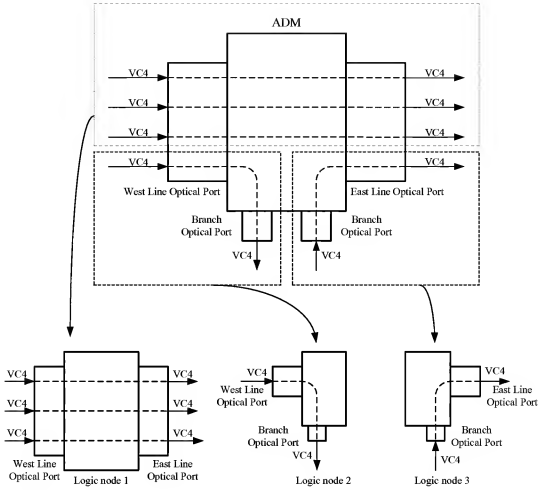
2. Logic-System

Since each optical port of each optical device of a SDH network is divided into minimum protection units, in order to implement protection based on the minimum protection unit, a SDH device of a SDH fiber transmission network, such as an ADM (add/drop multiplexer), a TM (terminal) and a REG (regenerator), also needs to be divided into a plurality of logical nodes according to the divided minimum protection unit, each of which includes at least one minimum protection unit. The logical nodes in the SDH fiber transmission network can consist of a plurality of logical function systems.

Each logical function system comprising physical media with the same basic topology, the same level and the same protection mode is called a "logic-system".

Consider an ADM device with a line bit rate of 622Mbit/s to discuss the concept of logic-system in detail. Referring to the following diagram, the west direction line and the east direction line of the ADM contains four VC4, and each VC4 is configured as a minimum protection unit, among them three VC4 input from the west line port are output to the east line port directly, one VC4 from the west line port is dropped to a branch port, and one VC4 is added from another branch port to the east line port. According to parameters as such as topology, level and protection mode etc, the ADM can be divided into 3 logic nodes. Logic node 1 comprises 3 minimum protection units of the west direction line and 3 minimum protection units of the east direction line; logic node 2 comprises 1 minimum protection unit of the west direction line and 1 minimum protection unit from the branch port; and logic node 3 comprises 1 minimum protection unit of the other branch line and 1 minimum protection unit of the east direction line. Logic nodes 1, 2, and 3 respectively with other corresponding logic-nodes divided from other nodes in the SDH network can form at least 3 "logic-systems", i.e. logic-system 1, logic-system 2 and logic-system 3. These logic-systems can perform protection switching respectively.

For example, when logic-system 3, which includes logic node 3, is influenced by a fault of the SDH network, only logic-system 3 will be switched without influencing other logic-systems according to the present invention, that is, logic nodes 1 and 2 will not be influenced by that fault.



Based on the above discussion, claim 1 is directed to an optical port divided into a plurality of minimum protection units, and the minimum protection units are divided into a plurality of logic-systems. After the logic-systems are established, the protection switching is performed within one of the four working modes. Since a switch occurs from a normal mode to one of the working modes, rather than the optical port nor the service channels, this method is more flexible than MS protection and less complex than channel protection.

Chapman is at best directed to providing a telecommunication network for arranging channel switching protection arrangement.

In the Office Action, the Examiner states the following:

> With regards to Applicant's claimed *step A*, Chapman teaches a network of nodes (Figure 1), wherein each node supports multiple working channels (col. 1, line 64), thus physically dividing the optical port into multiple minimum protection units. With regards to Applicant's claimed *step B*, Chapman teaches an automatic protection switch byte (APS) which can represent multiple values and is used to define a state of a channel (col. 4 lines 1-2), thus dividing the minimum protection units of more than one protection channel in each optical port into different logic-systems to form more than one logic-system.

Applicant respectfully submits that one skilled in the art would not agree with the statement by the Examiner.

According to the description of Chapman (col. 1 lines 20-24) "As used within the specification the term "channel" will be used to describe either a path or a section, the important factor being that each channel, path or section connecting a pair of nodes is uniquely identified by means of a trace signal". One skilled in the art would recognize, and as also addressed in Chapman (col. 1 lines 11-15), the term "section" in Chapman is associated with the physical links between adjacent nodes in a network, while the term "path" in Chapman is associated with a communication link between a pair of nodes.

The Examiner asserts that Chapman teaches a network of nodes (Figure 1), wherein each node supports multiple working channels thus physically dividing the optical port into multiple minimum protection units. According to the above statement, the channel in Chapman refers to either a path or a section, the working channel in Chapman refers to either a working path or a working link, and the protection channel in

Chapman refers to either a protection path or a protection link. Therefore, the protection performed based on the channel is either a path protection or a multiplex section (MS) protection. As discussed above, the "minimum protection unit" neither corresponds to a path nor a section, it is a protection unit divided from a physical optical port which can be "smaller" than a physical optical port and "bigger" than a path. Thus, Chapman fails to anticipate, teach, or suggest the concept of "minimum protection unit". Therefore, Chapman fails to teach or suggest step A "dividing the optical port into multiple minimum protection units".

Accordingly, Chapman fails to teach or suggest step B "dividing the minimum protection units of more than one protection channel in each optical port into different logic-systems to form more than one logic-system".

In the Office Action, the Examiner also asserts:

> With regards to Applicant's claimed Step C, Chapman teaches APS values that denote the equivalent of Applicant's claimed working modes. Figure 1 shows a network in the absence of a fault condition, ..., thus a normal working mode. Figure 2 shows a network in which a node is assigned an APS value equivalent to a switching working mode, ... Figure 3 shows a network in which a node is assigned an APS value equivalent to a bridging working mode, ... Figure 5 shows a network in which a node is assigned an APS value equivalent to a passing working mode, ...

Applicant respectfully submits that one skilled in the art would not agree with the statement by the Examiner. If a logic node is in a passing working mode, signals will be input from the protection channel and output to the protection channel, if a logic node is in a bridging working mode, signals will be input from the working channel and output to the protection channel, if a logic node is in a switching working mode, signals will be input from the protection channel and output to the working channel.

According to Chapman in Figure 2, node 3 will transmit traffic in both the working channel and protection channels in both directions, but Figure 2 is silent about node 3 or any other nodes receives signals from the protection channel and output the signals to the working channel. Therefore, Figure 2 does not disclose a network in which a node is assigned an APS value equivalent to a switching working mode. In Figure 3, node 4 receives traffic from the protection channel and transmits traffic to protection channels in both directions, but Figure 3 is silent about node 4 or any other nodes receives signals from the working channel and output the signals to the protection channel. Therefore, Figure 3 does not disclose a network in which a node is assigned an APS value equivalent to a bridging working mode. In Figure 5, node 4 receives traffic from the protection channel and transmits traffic to both the working channel and a protection channel in one direction, but Figure 5 is silent about node 4 or any other nodes receives signals from the protection channel and output the signals to the protection channel. Therefore, Figure 5 does not disclose a network in which a node is assigned an APS value equivalent to a passing working mode.

Moreover, it should be noted that the normal working mode, the switching working mode, the bridging working mode, and the passing working mode are four stable working modes that a logic node may take in normal or after a protection switch. Take the ring network in Figure 4 for example. If no fault occurs, logic nodes A, B, C, and D all work in the normal working mode, and if the fiber between nodes B and C breaks, node B will switch to the bridging working mode, nodes A and D will switch to the passing working mode, and node C will switch to the switching working mode.

Nodes A, B, C and D will remain in these states until the fiber is fixed. In view of Chapman, Figures 1 to 5 illustrate a protection procedure, that is how a protection switching is performed step in step. Specifically, Figure 1 illustrates a normal state; Figure 2 illustrates, when a fault occurs, how node 3 reacts to report the fault to node 4 (the first state in a protection switching procedure); Figure 3 illustrates how node 4 reacts when the fault is acknowledged from node 3 (the second state in a protection switching procedure); while Figure 5 illustrates how nodes 3 and 4 communicate traffic with each other after a protection switching (the last state of a protection switching procedure). In this point of view, Figures 1 to 5 in Chapman do not show any of the working states equivalent to the passing working mode, switching working mode and bridging working mode.

In view of the forgoing, Chapman fails to disclose or teach step C "each logic node in each logic-system working in one of the four working modes: normal working mode, passing working mode, bridging working mode and switching working mode" and step D "when the protection is needed, switching normal working mode of each logic node to the other three working modes".

In view of the foregoing, Applicant respectfully submits that neither Chapman nor Mochizuki, nor any combination thereof, teaches or suggests claim 1. Applicant respectfully submits that claim 1 defines over the art cited by the Examiner. Likewise, because claims 5-7 depend from claim 1, claims 5-7 also define over the art cited by the Examiner. Thus, Applicant respectfully requests withdrawal of the rejection under 35 U.S.C. § 102(b).

In view of the claim 8, the Examiner address that claim 8 can be anticipated by Mochzuki.

Mochzuki at best discloses an add-drop multiplexing apparatus, but is silent about "a component configured to divide the optical port into multiple minimum protection units; and divide the minimum protection units of more than one protection channel in each optical port into different logic-systems to form more than one logic-system" as claimed in claim 8. Therefore, Mochizuki fails to teach or suggest claim 8.

In view of the foregoing, Applicant respectfully submits that Mochizuki fails to anticipate claim 8. Likewise, because claim 10 depends from claim 8, claim 10 also defines over the art cited by the Examiner. Thus, Applicant respectfully requests withdrawal of the rejection under 35 U.S.C. § 102(b).

REJECTION UNDER 35 U.S.C. § 103

Claims 2-4 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Chapman in view of Applicant's admitted prior art. Claims 9 and 11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Mochizuki in view of Chapman. These rejections are respectfully traversed.

In view of the arguments presented above, which apply equally hereto, Applicant respectfully submits that neither Chapman nor Mochizuki, nor any combination thereof, teaches or suggests claim 1. Applicant respectfully submits that independent claims 1 and 8 define over the art cited by the Examiner. Likewise, because claims 2-4, 9, and 11 depend from claims 1 and 8, claims 2-4, 9, and 11 also define over the art cited by

the Examiner. Thus, Applicant respectfully requests withdrawal of the rejection under 35 U.S.C. § 103(a).

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action and the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 08-0750, under Order No. 9896-000023/US/NP from which the undersigned is authorized to draw.

Dated: October 17, 2007

Respectfully submitted,

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Attachments